Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for transmitting data in a multi-input multi-output communications system having at least two transmit antennas and M_r receive antennas, the data adapted to be transmitted via a channel having an associated channel matrix **H** with M_r ~~columns~~ rows, wherein the number of [[rows]]columns of matrix **H** is the same as the number of transmit antennas, the method comprising:

associating each u+n bits of the data with a symbol selected from 2^u labels of 2^n cosets, wherein each symbol is represented by a constellation point on a complex plane;

arranging the constellation points on the complex plane such that at least some of the arranged constellation points have real components that are distinct from real components of other arranged constellation points and wherein the at least some of the arranged constellation points have imaginary components that are distinct from imaginary components of the other arranged constellation points;

transmitting only real components of each pair of associated symbols as an input stream on a first one of the at least two transmit antennas; and

transmitting only imaginary components of each pair of associated symbols as a second input stream on a second one of the at least two transmit antennas.

2. (Original) The method of claim 1, wherein the input stream transmitted on the first transmit antenna is defined by:

$$x_1 = \mathrm{Re}(\mathrm{Enc}_1) + j * \mathrm{Re}(\mathrm{Enc}_2)$$

and wherein the second input stream transmitted on the second transmit antenna is defined by:

$$x_2 = \mathrm{Im}(\mathrm{Enc}_1) + j * \mathrm{Im}(\mathrm{Enc}_2)$$

wherein Enc_1 and Enc_2 represent a pair of arranged symbols, wherein $\mathrm{Re}(Enc_1)$ represents the real component of symbol Enc_1, wherein $\mathrm{Re}(Enc_2)$ represent the real component of symbol Enc_2, wherein $\mathrm{Im}(Enc_1)$ represents the imaginary component of symbol Enc_1, wherein $\mathrm{Im}(Enc_2)$ represent the imaginary component of symbol Enc_2, and wherein j represents $\sqrt{-1}$.

3. (Original) The method of claim 1, further comprising:

receiving a vector **r** of the transmitted symbols on the M_r receive antennas, wherein the vector **r** has M_r components; and

forming a label metric and a distance metric associated with each of the at least two transmit antennas.

4. (Original) The method of claim 3, wherein for coset j, the label metric associated with transmit antenna i is defined by:

$$label(i,j) = \arg\min_{k} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right)^H \Lambda^{-1} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right)$$

wherein i represents one of the at least two transmit antennas, j represents one of the 2^n cosets, k represents one of the 2^u labels of coset j, $x_j(k)$ represents the value of the k^{th} point in coset j, $\mathbf{h}_i$ is the i^{th} column of matrix **H**, $\mathbf{H}_{n\neq i}$ is a matrix of the remaining columns of **H**, and Λ^{-1} is an auto-covariance matrix of any of the at least two transmit antennas.

5. (Original) The method of claim 3, wherein for coset j, the distance metric associated with transmit antenna *i* is defined by:

$$d(i,j) = \min_{k,p} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right)^H \Lambda^{-1} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right).$$

wherein i represents one of the at least two transmit antennas, j represents one of the 2^n cosets, k represents one of the 2^u labels of coset j, $x_j(k)$ represents the value of the k^{th} point in coset j, $\mathbf{h}_i$ is the i^{th} column of matrix **H**, and $\mathbf{H}_{n \neq i}$ is a matrix of the remaining columns of $\mathbf{H}, \Lambda^{-1}$ is an auto-covariance matrix of any of the at least two transmit antennas, and p represents a set of possible transmitted symbols.

6. (Original) The method of claim 3, further comprising:

supplying the distance metric and the label metric associated with each transmit antenna to a Viterbi decoder.

7. (Original) The method of claim 1, further comprising:

interleaving each symbol prior to the transmitting steps.

8. (Original) The method of claim 1 wherein said arranging includes rotating coordinates of the constellation points.

9. (Currently Amended) An apparatus adapted to transmit data in a multi-input multi-output communications system having at least two transmit antennas and M_r receive antennas, the apparatus transmitting data via a channel having an associated matrix **H** with M_r ~~columns~~ rows, wherein the number of ~~rows~~ columns of matrix **H** is the same as the number of transmit antennas, the apparatus comprising:

a first module adapted to associate each u+n bits of the data with a symbol selected from 2^u labels of 2^n cosets, wherein each symbol is represented by a constellation point on a complex plane;

a second module adapted to arrange the constellation points on the complex plane such that at least some of the arranged constellation points have real components that are distinct from real components of other arranged constellation points and wherein the at least some of the rearranged constellation points have imaginary components that are distinct from imaginary components of the other arranged constellation points;

a third module adapted to transmit only the real components of each pair of the arranged symbols as an input stream on a first one of the at least two transmit antennas; and

a fourth module adapted to transmit only the imaginary components of each pair of the arranged symbols as a second input stream on a second one of the at least two transmit antennas.

10. (Original) The apparatus of claim 9, wherein the input stream transmitted on the first transmit antenna is defined by:

$$x_1 = \mathrm{Re}(\mathrm{Enc}_1) + j * \mathrm{Re}(\mathrm{Enc}_2)$$

and wherein the second input stream transmitted on the second transmit antenna is defined by:

$$x_2 = \mathrm{Im}(\mathrm{Enc}_1) + j * \mathrm{Im}(\mathrm{Enc}_2)$$

wherein Enc_1 and Enc_2 represent a pair of arranged symbols, wherein $\mathrm{Re}(\mathrm{Enc}_1)$ represents the real component of symbol Enc_1, wherein $\mathrm{Re}(\mathrm{Enc}_2)$ represent the real component of symbol Enc_2, wherein $\mathrm{Im}(\mathrm{Enc}_1)$ represents the imaginary component of symbol Enc_1, wherein $\mathrm{Im}(\mathrm{Enc}_2)$ represent the imaginary component of symbol Enc_2, and wherein j represents $\sqrt{-1}$.

11. (Original) The apparatus of claim 9 further comprising:

a fifth module adapted to receive a vector **r** of the transmitted symbols on the M_r receive antennas, wherein the vector **r** has M_r components; and

a sixth module adapted to form a label metric and a distance metric associated with each of the at least two transmit antennas.

12. (Original) The apparatus of claim 11, wherein for coset j, the label metric associated with transmit antenna i is defined by:

$$label(i,j) = \arg\min_{k} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right)^H \Lambda^{-1} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right)$$

wherein i represents one of the at least two transmit antennas, j represents one of the 2^n cosets, k represents one of the 2^u labels of coset j, $x_j(k)$ represents the value of the k^{th} point in coset j, $\mathbf{h}_i$ is the i^{th} column of matrix **H**, $\mathbf{H}_{n\neq i}$ is a matrix of the remaining columns of **H**, and Λ^{-1} is an auto-covariance matrix of any of the at least two transmit antennas.

13. (Original) The apparatus of claim 11, wherein for coset j, the distance metric associated with transmit antenna is defined by:

$$d(i,j) = \min_{k,p} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right)^H \Lambda^{-1} \left(\mathbf{r} - \mathbf{h}_i x_j(k) - \mathbf{H}_{n\neq i}\mathbf{X}\right).$$

wherein i represents one of the at least two transmit antennas, j represents one of the 2^n cosets, k represents one of the 2^u labels of coset j, $x_j(k)$ represents the value of the k^{th} point in coset j, $\mathbf{h}_i$ is the i^{th} column of matrix **H**, $\mathbf{H}_{n\neq i}$ is a matrix of the remaining columns of **H**, Λ^{-1} is an auto-covariance matrix of any of the at least two transmit antennas, and p represents a set of possible transmitted symbols.

14. (Original) The apparatus of claim 11, wherein said apparatus is adapted to supply the distance metric and the label metric associated with each transmit antenna to a Viterbi decoder.

15. (Currently amended) The apparatus of claim 11, wherein each of the first, second, third, fourth, fifth and sixth modules is a software module.

16. (Original) The apparatus of claim 11, wherein each of the first, second, third, fourth, fifth and sixth modules is a hardware module.

17. (Original) The apparatus claim 11, wherein each of the first, second, third, fourth, fifth and sixth modules includes both software and hardware modules.

18. (Original) The apparatus claim 9 further comprising:
a seventh module adapted to interleave each of the arranged symbols.

19. (Original) The apparatus claim 9 wherein said second module is further adapted to rotate coordinates of the constellation points.